CLAIMS

1. A device for mixing a first fluid at a first temperature with a second fluid at a second temperature, the fluids being mixed in the form of coaxial streams flowing in the same direction, the device comprising a generally cylindrical tubular casing (2) having a substantially rectilinear axis (4) defining a cylindrical mixer chamber (3) coaxially inside the casing (2) and comprising, at a first axial end, a first coupling element (5) for coupling to first fluid feed means, and at a second axial end, opposite from the first, a second coupling element (6) for coupling to means for exhausting the mixture of the first and second fluids, and at least one guide duct (8, 18) for guiding at least one of the first and second fluids, the at least one duct being substantially rectilinear and disposed coaxially inside the mixer chamber (3), the device being characterized by the fact that it includes a third coupling element (7) for coupling the mixer chamber (3) to second fluid feed means, the third coupling element being in a position in the axial direction that is intermediate between the first and second coupling elements (5, 6) and extending in a transverse direction that is substantially perpendicular to the axial direction, and the guide duct (8, 18a, 18b) extends axially in the mixer chamber (3) between the first coupling element (5) and a zone (15) of the mixer casing (3) downstream from the third coupling element (7) in the direction going from the first coupling element to the second, and comprises a tubular wall including at least one coaxial insulating internal annular space (9, 19a, 19b, 19c, 19'a, 19'b, 19'c) in communication with a zone of the mixer chamber (3), said space extending substantially over the entire length of the guide duct (8, 18a, 18b), the third coupling element (7) opening out into the mixer chamber (3) so as to face an outside surface of the wall of the guide duct (8, 18a, 18b).

2. A device according to claim 1, characterized by the fact that the guide duct comprises both a first tubular duct (18a) extending axially inside the mixer chamber (3) from the first coupling element (5) at one axial end of the mixer chamber (3) and a second tubular duct (18b) having a diameter greater than the outside diameter of the first tubular duct (18a) and disposed coaxially relative to the first tubular duct (18a) and the mixer casing (2), having a first axial end inside the cylindrical chamber with an end portion of the first tubular duct (18a) engaged therein, and a second axial end downstream from the third coupling element (7) that opens out into the mixer chamber (3) facing the outside surface of the wall of the second tubular duct (18b), in such a manner that the second fluid introduced into the mixer chamber (3) via the third coupling element flows in an annular zone of the mixer chamber (3) that is closed at the second axial end of the second tubular duct, flowing axially towards the first end of the second tubular duct (18b), and then, in the opposite direction, inside the second tubular duct (18b) between the first and second axial ends of the second tubular duct, the first and second fluids mixing in the form of coaxial streams flowing in the same direction in a mixing zone (17) inside the second tubular duct (18b).

3. A device according to claim 2, characterized by the fact that each of the first and second tubular ducts (18a, 18b) is constituted by a set of coaxial shells engaged one on another and including wall portions of reduced thickness so as to leave between them coaxial annular spaces (19'a, 19"a, 19"'a), and pierced by openings putting the coaxial annular spaces (19a, 19b, 19'a, 19"a, 19"'a, 19'ab, 19'bc) into communication with a medium outside the tubular duct (18a, 18b) in the mixer chamber (3).

4. A device according to claim 3, characterized by the fact that the second tubular duct (18b) includes an inner shell (20) projecting from one of its axial ends relative to the set of shells of the second tubular duct (18b) in order to be engaged around the first tubular duct (18a) with radial clearance and pierced by openings (20') for passing fluid into an annular space between the outer surface of the first tubular duct (18a) and the inner surface of the inner shell (20) of the second tubular duct (18b).

5. The use of a mixer device according to any one of claims 1 to 4, for mixing a first fluid mainly constituted by supercritical water used for treating effluents by oxidation in supercritical water, together with a second fluid mainly constituted by cooling water at a temperature that is substantially less than the temperature of the first fluid.

6. A use according to claim 5, characterized by the fact that the first fluid is at a temperature of 550°C and the second fluid at a temperature of about 20°C.

WHAT IS CLAIMED IS:

1. A device for mixing a first fluid at a first temperature with a second fluid at a second temperature, the fluids being mixed in the form of coaxial streams flowing in the same direction, the device comprising a generally cylindrical tubular casing having a substantially rectilinear axis defining a cylindrical mixer chamber coaxially inside the casing and comprising, at a first axial end, a first coupling element for coupling to first fluid feed means, and at a second axial end, opposite from the first, a second coupling element for coupling to means for exhausting the mixture of the first and second fluids, and at least one guide duct for guiding at least one of the first and second fluids, the at least one duct being substantially rectilinear and disposed coaxially inside the mixer chamber, the device including a third coupling element for coupling the mixer chamber to second fluid feed means, the third coupling element being in a position in the axial direction that is intermediate between the first and second coupling elements and extending in a transverse direction that is substantially perpendicular to the axial direction, and the guide duct extends axially in the mixer chamber between the first coupling element and a zone of the mixer casing downstream from the third coupling element in the direction going from the first coupling element to the second, and comprises a tubular wall including at least one coaxial insulating internal annular space in communication with a zone of the mixer chamber, said space extending substantially over the entire length of the guide duct, the third coupling element opening out into the mixer chamber so as to face an outside surface of the wall of the guide duct.

2. A device according to claim 1, wherein the guide duct comprises both a first tubular duct extending axially inside the mixer chamber from the first coupling element

at one axial end of the mixer chamber and a second tubular duct having a diameter greater than the outside diameter of the first tubular duct and disposed coaxially relative to the first tubular duct and the mixer casing, having a first axial end inside the cylindrical chamber with an end portion of the first tubular duct engaged therein, and a second axial end downstream from the third coupling element that opens out into the mixer chamber facing the outside surface of the wall of the second tubular duct, in such a manner that the second fluid introduced into the mixer chamber via the third coupling element flows in an annular zone of the mixer chamber that is closed at the second axial end of the second tubular duct, flowing axially towards the first end of the second tubular duct, and then, in the opposite direction, inside the second tubular duct between the first and second axial ends of the second tubular duct, the first and second fluids mixing in the form of coaxial streams flowing in the same direction in a mixing zone inside the second tubular duct.

3. A device according to claim 2, wherein each of the first and second tubular ducts is constituted by a set of coaxial shells engaged one on another and including wall portions of reduced thickness so as to leave between them coaxial annular spaces, and pierced by openings putting the coaxial annular spaces into communication with a medium outside the tubular duct in the mixer chamber.

4. A device according to claim 3, wherein the second tubular duct includes an inner shell projecting from one of its axial ends relative to the set of shells of the second tubular duct in order to be engaged around the first tubular duct with radial clearance and pierced by openings for passing fluid into an annular space between the outer surface of the first tubular duct and the inner surface of the inner shell of the second tubular duct.

5. The use of a mixer device according to claim 1, for mixing a first fluid mainly constituted by supercritical water used for treating effluents by oxidation in supercritical water, together with a second fluid mainly constituted by cooling water at a temperature that is substantially less than the temperature of the first fluid.

6. A use according to claim 5, wherein the first fluid is at a temperature of 550°C and the second fluid at a temperature of about 20°C.